Critical Release Notice

Publication number: 297-1001-155
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The content of this customer NTP supports the ISN06 (TDM) software release.

Bookmarks used in this NTP highlight the changes between the baseline NTP and the current release. The bookmarks provided are color-coded to identify release-specific content changes. NTP volumes that do not contain bookmarks indicate that the baseline NTP remains unchanged and is valid for the current release.

Bookmark Color Legend

Black: Applies to new or modified content for the baseline NTP that is valid through the current release.

Red: Applies to new or modified content for ISN04 (TDM) that is valid through the current release.

Blue: Applies to new or modified content for ISN05 (TDM) that is valid through the current release.

Green: Applies to new or modified content for ISN06 (TDM) that is valid through the current release.

Attention!
Adobe® Acrobat® Reader™ 5.0 is required to view bookmarks in color.

Publication History

March 2004

Standard release 01.03 for software release ISN06 (TDM).

Change of phone number from 1-800-684-2273 to 1-877-662-5669, Option 4 + 1.

297-1001-155

DMS-100 Family

Peripheral and Trunk group/Line Assignments

Reference guide

TL02 Standard 01.02 May 1998

NORTEL
NORTHERN TELECOM

DMS-100 Family

Peripheral and Trunk group/Line Assignments
Reference guide

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Publication history

May 1998

Standard 01.02

- Updated and verified reference documents.
- Document migrated into new template.

Contents

About this document

When to use this document

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the *same* software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in *Product Documentation Directory*, 297-8991-001.

This document is written for all DMS-100 Family offices. More than one version of this document may exist. To determine whether you have the latest version of this document and how documentation for your product is organized, check the release information in *Product Documentation Directory*, 297-8991-001.

References in this document

The following documents are referred to in this document:

- *SuperNode Technical Specification, PLN-5001-001*
- *Power Distribution Systems, 297-1001–156*
- Glossary of Terms and Abbreviations Reference Manual *, 297-1001-825*
- *Installation Metthods, IMs*
- *Provisioning Guide , PLN–8991-104*

- *Translations Guide, 297-XXXX-350*

Note: XXXX refers to the PCL layer numbers.

What precautionary messages mean

The types of precautionary messages used in NT documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION Information needed to perform a task

ATTENTION

If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER Possibility of personal injury

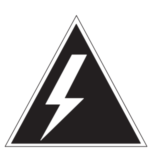


DANGER

Risk of electrocution

Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING Possibility of equipment damage



WARNING

Damage to the backplane connector pins

Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION Possibility of service interruption or degradation

> **CAUTION**
> **Possible loss of service**
> Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

>BSY

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL *ctrl_no*

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

The following excerpt from a procedure shows the command syntax used in this document:

1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no
and pressing the Enter key.

where

ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

General

Introduction

This publication outlines the rules governing the assignment of trunk groups and lines to the Peripheral Modules (PM) of the DMS-100 Family digital multiplex switching systems. This publication also describes the forms and documents released to the telephone company (Telco) for assignment purposes, and make recommendations to aid the Telco in expressing their requirements via these forms.

PM to network relationship

Fig.1 illustrates the relationship between the PM and the Network Modules (NM). One NM, and its associated Network Message Controller (NMC), are located in each network equipment frame (NET). It is recommended, however, that the documents listed as references be read before using this publication, to obtain more detailed information about the purpose of the components of the system, and of their functional and physical relationship to each other and to the distribution frame (DF).

References

References listed as ”Prerequisites” are essential for an understanding of this publication. Those listed as ”Information” contain additional information concerning other items mentioned in this publication, but are not essential. All references are inserted at the appropriate place in the text.

Prerequisites

Document Number	Title
PLN-5001-001	SuperNode Technical Specification Guide
297-1001-825	Glossary of Terms and Abbreviations Reference Manual
IMs	Installation Methods

Information

Document Number	Title
IMs	Installation Methods
297-1001-156	Power Distribution Systems
PLN-8991-104	Provisioning Guide
297-XXXX-350	Translations Guide
NT8600	Northern Telecom Questionnaire
HB8600	NT8600 Questionnaire Handbook
GS2X17	Line Card Type A
GS2X18	Line Card Type B
GS0X56	Speech Link Connecting Frame

Note: XXXX refer to the PCL layer numbers.

Forms

The purpose of the forms used in peripheral assignments is to provide a standardized system of conveying the information between Northern Telecom (NT) and the Telco. The information entered on these forms is used to compile tables of the relationships between the trunk and line interface circuits and the DF, and the physical location of the circuits in the equipment frames. After completion, the data are recorded on the office load tapes and are referenced in the customer data schema (297-XXXX-350).

The following types of forms are used in the peripheral assignment process.

1 Drawing. 6199-010-D620.

2 Worksheets. 1773-010-W800. 6468-020-W810.

3 Office Records. 6895-010-R810. 6895-010-R820.

For reference purposes in this publication, the forms are hereafter referred to by their last four characters (e.g., D620). The format and contents of the forms are described in chapter 2 of this publication.

Information flow

The process of peripheral and trunk group assignments commences on receipt by Northern Telecom of the completed NT8600 questionnaire forms from the Telco. The NT8600 questionnaire is the official document by which the Telco transmits information to Northern Telecom regarding the

parameters to be used in compiling the hardware and software requirements for an office. All terms and procedures used in the NT8600 questionnaire forms are defined in the accompanying handbook HB8600, provided by Northern Telecom.

Figure 2 illustrates the approximate time schedule, commencing at the date of receipt of ”customer approval information” (CI), to document release date (D), and finally to line load tape release date two days before ”installation complete” (K) date.

Between CI date and D minus 20, forms D2600, W800 and R820 are completed by Northern Telecom based on the information in the NT8600 questionnaire.

At D minus 20 days the D260, W800 and R820 forms are released to the Telco. These documents contain the results of the hardware assignment process, and serve as inputs to the trunk group assignments. The Telco enters digit translation and trunk group assignments on the translation forms and sends them, when completed, to Northern Telecom by D minus 8 date.

At D, the line card documents R810 and W810 are released to the Telco. These documents contain the output of the line hardware assignment process, and serve as an input to the directory number assignment. The Telco enters directory number assignments and line data on the line data translation forms, and sends the completed document to NT at K-8 date.

The completed trunk group translation forms, received by NT at D-8, are data checked, the software is generated, and the main office load tape is produced by D+2 date.

The completed line data translation forms, received by NT at K-8, are data checked, the line software is generated and the line load tape is produced by K minus 2 date.

Peripheral assignment forms

Drawing D620

Drawing D620 consists of six sections, each section listing a different aspect of the relationship between the PM, the Speech Link Connecting (SLC) frame, and the Network (NET). The SLC is a connectorized frame which organizes the speech link cabling between the PM and NM. An SLC frame contains two types of connectorized shelves, one type (PSL) is connected to the PM and the second type (NSL) is connected to the NET. The two types of shelves are mounted alternately on the SLC frame and are interconnected by 4-wire patch cords. The SLC is described in more detail in GS0X56.

Form D620. Section 1. (Fig. 3). This section lists the assignments between the PSL shelf connectors and the frame, shelf and port identifcations of the PM. In the example, the Trunk Module Equipment (TME) types of frames are shown. The terminology and abbreviation scheme used in this example, and in other examples throughout this practice, is defined in detail in 297-1001-825. The column ”POS” refers to the base mounting positions of the shelves in each frame. Other types of PM frames could appear in this listing, i.e., Digital Carrier Equipment (DCE) or Line Module Equipment (LME).

In the example, the header of this form refers to SLC frame 00, PSL:00, located at base mounting position 68. The remainder of the header gives the floor and row identifiers of the SLC.

The first line of the form shows that SLC cable 08 contains wiring for four ports (0-3), which are assigned to frame TME 008. This frame contains three Trunk Module shelves (2 types: TM8, TM2) and an Office Alarm Unit (OAU). The bottom TM in TME 008 (TM8:0016) is located in base mounting position 04. A TM has only two ports per plane (port 0 usually connects to network plane 0, and port 1 to network plane 1). In the examples, only port 0 is listed, it is assumed that port 1 is similar.

For other types of PM frames this column would show ports in the range of 0-4 (5 ports) for DCE, and up to four ports (0-3) for LME. These types also have duplicate ports to the two network planes.

Form D620. Section 2. (Fig. 4). This section lists the assignments between the NSL shelf ports and the network ports. The first line of the example shows that the 64 ports (0-63) of NSL:00, located in SLC frame 00 at base mounting position 71 (top of the frame) are assigned to ports 0-63 on NET frame 00.

Form D620. Section 3. (Fig. 5). This section is a map of the SLC 0 and SLC 1 frames showing for each pair of frames (plane 0 and plane 1 frames are identical), which shelves are mounted and how many ports are used. One line is used per shelf. Note how NSL and PSL shelves alternate from the top (POS 71) of the frame down. Empty base mounting positions are represented by blank lines.

Equipped base mounting positions are each represented by one line of 16 numbers, one for each field (NSL) and cable group (PSL). The numbers show how many ports are assigned in each field (max. 4 ports per NSL), or cable group (max. 5 ports per PSL).

Form D620. Section 4. (Fig. 6). This section shows the peripheral location, the peripheral-SLC relationship, the NET-SLC relationship, and the network location.

The peripheral location columns list the PM frame type and functional reference in numerical order, the shelf functional reference, the base mounting position (where applicable), the peripheral port number, the power feed, and the type of DF on which the peripheral terminates. Power feeds are alternated between feeds A and B with the general purpose of spreading the power load as evenly as possible, and feeding the network planes from separate feeds as a means of providing power failure protection. Details of the various power feed methods used for different types of PM are contained in 297-1001-156, which describes the Power Distribution Center (PDC).

The peripheral-SLC columns list the SLC frame functional reference, the base mounting position of the PSL shelf, the cable group (CG) carrying the speech link, and the PSL port number.

The NET-SLC columns list the SLC frame functional reference, the base mounting position of the NSL shelf and the NSL port number.

The network location columns list the functional reference of the NET frame, and the Network Sub Group (NSG) number of the crosspoint switches on which the network port number (last column) is located. Each group of eight ports on the peripheral face of an NM, associated with one ”transmit” and one ”receive” pair of crosspoint (XPT) time switches, is referred to as a Network Sub Group (NSG). For example (see Fig. 1), NSG-0 in NM-0 would consist of Inc.XPT 0 and Og.XPT 0 in side A, plus Og.XPT 0 and Inc.XPT 0 in side B. There are eight NSG (0-7) per NET

frame. NSG 0, therefore, comprises ports 0 through 7 on NM-0, while NSG 7 comprises ports 56 through 63.

Each line of this table (see Fig. 6) gives a complete picture of the cross-connections between a port on any type of PM, via the SLC to its assigned port on the NET frame. This listing is useful when completing the trunk group assignment worksheets W800.

Form D620. Section 5. (Fig. 7). This section contains the same information as Section 4, but the listing is arranged in numerical order of NET, NSG and network ports in the left-most columns. This section is a reversal of Section 4, and is also useful for trunk group assignments.

Form D260. Section 6. (Fig. 8). This section lists by type of DF, the spread of each type of PM across each NET frame and NSG. Since TM, Maintenance Trunk Modules (MTM) and OAU have only one port per NET plane, the number in the ”Peripheral Modules Assgd.” field will always be equal to the number in ”Network Ports Used” (see example: OAU). For other PM (LME and DCM), which have more than one port per module, these fields will be equal only if the distribution has been properly performed in the previous assignments. In the example, a proper assignment of a DCM between a DSX-1 type DF and the NET is illustrated. If a ”Peripheral Modules Assgd.” field contained, for example, 1 while ”Network Ports Used” was 4, then all ports on that NSG would have been assigned to the same DCM, and the distribution would be poor.

Worksheets W800 and W810

Worksheets W800 and W810 are provided as a tool to assist the Telco when assigning trunk group and directory numbers. The W800 worksheet is used for trunk group assignments and the W810 worksheet for directory number assignments.

Form W800 Trunk Group Assignment. This form consists of two sections (Section 10, Section 20). Section 10 is used to list the assignment of digital carrier trunks to DCM, while section 20 is used for analog assignments to TM.

1 Section 10 (Fig. 9). The header of this worksheet identifies a DCM with respect to its position in the DCE, its circuit number, power feed and DF type. The columns list the carrier channel number and the time slots for DE-2 and DE-3 carrier equipment. One worksheet is required for each of the five DCM circuits (00 through 04) on each DCM. If a DCE contained four DCM, twenty Section 10 sheets would be required. The Telco fills in the CLLI (Common Language Location Identifier) and TRK NO IN GROUP fields, arranging the trunk selection in accordance with the rules described in part 4 of this practice for digital trunk assignments.

2 Section 20 (Fig. 10). This worksheet gives the layout of TM trunk interface cards by trunk card product engineer- ing code (PEC), with respect to the DF type to which they are connected. The mounting location of the card (shelf type, circuit number, frame and shelf position) and associated network assignment are also listed. The Telco fills in the blank CLLI and Trk. No. in Grp. columns, in accordance with the rules described in part 4 of this practice for analog trunk assignments.

Form W810. Line Card-Directory Number Worksheet. (Fig. 11). This worksheet is provided to assist the Telco with direc- tory number and class-of-service assignments. The CKT TYP column lists the type of line circuit (LC) card required to interface with each type of subscriber"s line. There are currently two types of LC, A and B. The type A card interfaces with domestic subscriber lines not having any special features. The type B card has additional features for interface with coin-operated and PBX equipment. More details of the LC are contained in GS2X17 (Type A) and GS2X18 (Type B).

In the example, assignments to LME 00 through 07 are illustrated. The LC circuit numbers range from 00 to 31 and Line Drawer (LD) numbers range from 00 to 19. Each LD contains 32 LC. The Telco completes the blank "class of service" and "directory number" columns sequentially. Proper assignment is achieved automatically as described in part 4 of this practice.

Offcie records R810, R820

The office record forms R810 and R820 show the layout of the PM frames with respect to the location and types of their interface circuit cards. Form R810 contains the record of line circuit cards, while form R820 records the trunk and special circuit cards.

Form R810. LME Layout. (Fig. 12). Each page of form R810 shows the assignments for ten Line Drawers (LD). Each line records the product code, power feed, MDF type and zone, and card types of all 32 LC in the associated LD. The header of form R810 lists the frame and bay number, the product code, and the locational identifier of the LME in which the listed LD are located. Each bay of an LME would therefore require two sheets to list all 20 LD card complements.

Form R820. Trunk Layout. This record consists of two sections, one listing trunk layout by PM frame type, and the other providing a summary of analog trunk interface cards.

1 Section 1 (Fig. 13). This section lists all interface circuits used in a TME or DCE frame and relates them to the functional references and location identifiers of their associated frames and shelves. In the example, DCE 001 (located on floor 01, row EE, bay position 02) contains three DCM shelves 004, 005 and 006, and one MTM shelf 01. The product codes for the DCE and its shelves are also listed. In the CARD columns, the card types are listed by card position, card product code, and circuit references. Note that the Signal Distribution (SD) card (NT2X57) and Scan Card (NT0X10) also list the number of secondary circuits (points) per card primary circuit. See 297-1001-120 for details of the circuit reference scheme with respect to primary and secondary card circuit nomenclature.

2 Section 2 (Fig. 14). This section provides a summary of all analog trunk cards, arranged by DF type, product code and circuits per card, in ascending numerical order of product code number. Each line lists the quantity of each card type against the functional reference of the TM shelf type, and the location of the shelf in the TME frame. The power feed for each shelf is also listed.

Peripheral assignments guide

General

This part describes guidelines which should be considered when completing the blank trunk group and directory number assignments section of the W800 and W810 worksheets. The provisioning rules mentioned occasionally in this part are included in PLN-8991–104, which contains a comprehensive coverage of the provisioning methods applicable to all aspects of the DMS–100 Family systems.

PM to frame assignments

Assignments to PM frames are governed by the architecture of each type of frame. The following factors should be taken into consideration:

1 **Trunk Module Equipment (TME) Frame.**

— Each TME can accomodate up to a total of five TM, or four TM and one Maintenance Trunk Module (MTM) or OAU.

— TM are spread by type across as many TME as possible, e.g.: see Fig. 3, where TME 009 through TME 014 contain a mixture of TM2, TM8, MTM and OAU, and the functional reference numbers are not consecutive.

— Since all TM in a particular TME have the same power feed, one half of the TM of a particular type should be assigned to an A–feed TME and the other half to a B–feed TME. Only the last two frames, one A–feed and the other B–feed can be partially equipped. An MTM requires a separate power feed.

2 **Digital Carrier Equipment (DCE) Frame.**

— Each DCE frame can accomodate four DCM.

— All DCM are of the same type, the assignment process consists of assigning them to DCE in consecutive order of functional reference numbers.

— A DCE has an A and a B power feed, therefore two DCM are connected to A–feed, and two to B–feed. The last DCE frame can be partially equipped.

— An MTM shelf can be mounted on a DCE frame (e.g.: see Fig. 13), and is usually located in the top base mounting portion, but requires a separate power feed.

3 **Line Module Equipment (LME) Frame.**

— Each LME frame consists of two bays, each containing one LM.

— Each LM (one bay) contains 20 Line Drawers (LD) numbered 00 to 19 and positioned in a fixed pattern. Base mounting position numbers are therefore not required to locate an LD. Line circuit assignments use the LME and bay number, the LD number and the LC number within each LD (e.g.: see Fig. 11). There are 32 LC in each LD; giving a total of 640 LC per LM, and 1280 LC per LME frame.

— The 20 LD can be assigned to MDF in unzoned or in 2, 4, 5 or 10–zone termination patterns (see Fig. 15). If there are less than 20 LD provisioned per bay, the empty positions will be assigned to the top of the bay when the MDF is not zoned, and at the end of each group of LD when the MDF is zoned.

Card to PM assignments

The general objective for card to PM assignments is to spread cards by type as evenly as possible over all PM in the office. The extent to which this objective can be achieved is governed by the architecture of each type of PM. The following assignment rules should be observed:

1 **Analog Trunks to TM.**

— Cards that will only operate with a particular type of TM (e.g., TM2, TM8) should be assigned first. (Fixed cards).

— Cards that will operate with more than one type of TM should be assigned only after all the fixed cards have been assigned.

— The trunk card type with the smallest quantity should be assigned first, and the type with the largest quantity last.

— Where the TM have vacant card positions (i.e., more positions than are currently required), the unused positions should be spread evenly across all TM. This enables future expansion to be spread uniformly by adding plug–in provisional (PIP) cards in the vacant positions, leaving existing card assignments unaf– fected.

— A minimum of two cards per trunk group is required for reliability. Each card should be located in separate TM, which should obtain their power from separate battery feeds. For example, both circuits in a two–circuit trunk card should not be assigned to the same trunk group. One of the circuits should be assigned to a trunk in another group.

— The assignment of trunk cards should include adminis– trative spares.

2 **Digital Trunks to DCM.**

— DCM require only one type of line card, regardless of the type of carrier system (DE2, DE3, etc.). Each line card interfaces with one carrier circuit (24 digital trunks).

— A DCM accomodates up to five line cards, identified as circuits 0 through 4. To avoid confusion with the term”channel”, used elsewhere in the DMS–100 Family systems, each of the 24 trunks per circuit has a”time slot” numbered 1 through 24.

— For DCM operating with only one carrier circuit, no decision is required, and the assignment can be made to any line card on any DCM.

— When more than one carrier circuit is in use, the circuits should be assigned to DCM spread uniformly across all DCE frames, and to line cards located in as many different DCM as possible.

3 **Lines to LME.**

— The objective of line card assignment is to achieve a balanced traffic load on the network by spreading each type of line circuit (A or B) among all MDF zones and LME bays.

— It is not necessary to mix types of line circuit cards within line drawers. Line drawers can contain all A or all B line card types, but line drawers full of A or B type cards should be mixed within each LME bay.

— If the office has more than one DF, then the assign– ments for LME connected to each DF should be done separately.

PM to Network assignments

Network assignments attempt to spread each type of PM over as many NM and NSG as possible, as described in earlier parts of this practice. When spreading is done in this manner, as long as the total network traffic is below the rated capacity of the network, traffic balancing is not necessary. See Part 5 of this practice. Office engineering, based on parameters provided by the Telco on the NT8600 questionnaire, ensures that total traffic from the PM does not exceed the combined capacity of all the NM.

TM to Network

Each TM has one port per network plane, each port having 30 voice and two message channels. The follow– ing assignment of ports is primarily concerned with TM port 0 to plane 0 of the network. TM port assignments to plane 1 are identical to plane 0 and are not listed on the assignment forms.

Fig. 6 illustrates the application of the principle of spreading the assignment of TM ports to Network ports. Notice that the first TM in the example (TM8:0000 in TME 000) is assigned to NET 04, NSG04, Port 00). The second TM in the same TME is assigned to a different NET frame, NSG number and port number. In the example, TM are all connected to the MDF, but if an office has more than one type of DF, then the assignments for each type of DF would be done separately. For example, if an office has two types of DF and 16 TM8, 12 connected to one DF and four to the other, then the group of 12 would have separate network assignments from the group of four. Each type of TM is also assigned separately.

DCM to Network

A DCM has four network ports per plane which are connected internally to the five DCM line cards in a fixed pattern. This pattern automatically determines the relationship between the 120 (5x24) digital carrier time slots and the 120 (4x30) channels to the network via the four network ports. This relationship is a factor in digital trunk group assignments, and is covered in more detail in part 4 of this practice.

The objective of DCM to Network assignment is to spread the connections between the four DCM ports and the network over as many NM and NSG as possible. Assignments are performed on a DF basis, i.e., per carrier equipment bay (DSX). Fig. 7 illus– trates the application of this principle. Note that NET 00 has six of its ports assigned to digital service, but that none of these are from the same DCM, and no more than two ports per NSG are assigned to DCM. All the DCM in the example are connected to the same DF (DSX–1).

LME to Network

Each of the two bays in an LME has two, three or four network ports per plane, depending on the traffic requirements. A 2, 3 or 4–port LME type is selected to satisfy the grade–of–service objective. The traffic capacities of the three LME types are listed in PLN-8991-104. The general rule is that the ports on an LME should be assigned to at least two NM, or if the office is small and has only one NM, to at least two NSG on that NM. The objective is to evenly distribute LME ports among all NM and NSG, as follows:

1 All ports for one LME bay should be assigned to different NM.

2 Only one port from any given LME bay should be assigned to one NSG.

The application of this rule is illustrated in Fig. 6. In the examples, note that all four ports of LME 13 bay 1, and LME 14 bay 0 are assigned to different NET frames. On LME 14 bay 1, the four ports are assigned to the same

numbered NSG and network ports, but these are located on different NET frames 01 through 04.

Trunk group and directory number assignments guide

Trunk group assignments

The trunk group assignment is performed by the Telco, who completes the translation forms provided by Northern Telecom. See INFORMATION FLOW, part 1 of this practice.

Sections 10 and 20 of the W800 worksheet are provided by Northern Telecom to the Telco for use as a tool to assist the trunk group assignment process. Assignments for digital and analog trunks are performed independently even if a trunk group contains a mixture of the two types of trunks.

1 **Analog Trunk Assignments**. For analog trunk assignments, the following factors should be taken into consideration:

a. The TM-NET assignment is performed by Northern Telecom as part of the office hardware provisioning process. The results are listed on the D620 (Fig. 7), R820 (Figs. 13, 14) and W800 worksheet, section 20 (Fig. 10). The blank CLLI and Trunk Group columns of the W800 worksheet are for the use of the Telco as a work area.

b. When assigning trunk groups to the TM, the TM-NET assign- ments should be continually checked to ensure that the trunk group is uniformly distributed over as many NET and NSG as possible.

c. A trunk group must be evenly divided between at least two NSG on two separate NET. If the office has only one NET, the group should be split between different NSG on the same NET. If the trunk group is large and appears on all the TM, the NET distribution will be automatically accomplished. If the trunk group is small and appears on fewer than all TM, choose assignments to give the maximum possible spread.

d. The smallest trunk group should be assigned first and the largest trunk group last. If large trunk groups are assigned first, then most of the trunk card locations will be used up and it will not be possible to guarantee a good spread for the smaller trunk groups.

e. Split each trunk group into two halves; one half has to be assigned to A-powered TM's and the other half to B-powered TM"s. The number of trunks to appear on each TM should be determined as follows:

$$\text{No.of trunks on a TM} = \frac{\text{No. of trunks in trk-grp}}{X}$$

where X = the quantity of TM on which the trunk type under consideration appears. For example, if the trunk type has PEC NT2X83AA and appears on five TM, then X = 5. For small trunk groups which contain less trunks than the quantity of TM, one trunk from each group should be assigned to as many different TM as possible.

f. After the number of trunks to appear on a particular NM has been determined, they should be spread uniformly across all the NSG in the NM. If the number of trunks to be assigned to the NM is less than 8, then the trunk group will not appear on some of the NSG.

2 **Digital Trunk Assignments.** The following factors should be considered when assigning digital trunks to DCM:

a. The DCM-NET assignment is performed by Northern Telcom during the hardware provisioning process, and is listed on the D620 form (Fig. 7) along with assignments for TM and LME. Each DCM is identified on the header of its W800 worksheet (section 10, Fig. 9), by DCE number and base mounting position. Each DCM has five circuit cards, each of which is connected to a separate carrier system. The trunk cards are identified as CKT Nos. 00 through 04, with each card having one W800 worksheet.

b. Each carrier system has 24 trunks, and usually contains one trunk group. The assignment procedure then involves entering the CLLI of each of the trunks in the group, to which the facility is connected, against the time slot number of the DCM circuit identified in the header of the W800 sheet.

c. If the trunk group is larger than 24 trunks, the group will span more than one DCM circuit and will require more than one DCM circuit card. Also, the span could contain more than one digital trunk group. For example: if the span contains two trunk groups of 36 trunks each (2x36=72), three DCM line cards (3x24=72) will be required for the span. For increased reliability, the practice is to assign one third of each trunk group(e.g., 12 trunks) to each DCM line card.

d. Each DCM line card is assigned to the four network ports in a fixed pattern of cross-connections. The 24 time slots associated with each line card are divided into four sub-groups.

Sub-Group	Time Slot Nos
A	1, 5, 9, 13, 17, 21
B	2, 6, 10, 14, 18, 22
C	3, 7, 11, 15, 19, 23
D	4, 8, 12, 16, 20, 24

e. The hardware assignment process ensures that the four ports are assigned to different NSG. In this way, if one DCM card contians only one trunk group, it is automatically distributed over the four ports and there- fore to four different NSG. This is illustrated in Fig. 15. Note the relationship between the time slots (TSL) 1-24 and NSG 0, 1, 2, 3.

f. In the example of the two groups of 36 trunks (see c.), the practice of using the sub-group assignment method is also illustrated in Fig. 15. The two trunk groups (designated I and II) are assigned so that three trunks from each trunk group are assigned to three time slots in sub-groups A, B, C and D sucessively, until all 36 trunks of each group have been assigned to three out of the five DCM line cards. Note that this also spreads the trunk assignments equally over the four NSG 0 through

Directory number assignments

The LME-NET assignment is performed by NT during the hardware assignment process, and is listed on the D620 form (Fig. 6). Note that this process assigns the four ports of each bay of the LME to a different NET and NSG.

The directory number assignment worksheet W810 (Fig. 11) is designed so that when directory numbers are assigned sequen- tially by class of service, the assignment is automatically spread evenly over all LME bays. Note the pattern of LME, bay, LD and CKT numbers which ensures that all the line circuits 00 in both bays of each LME are assigned first, then all the circuits in LD 00, and so on until all 32 circuits in all 20 LD of each bay have been assigned. This pattern achieves an even traffic load on the LME and their associated NET.

When the MDF is zoned, the zone number is listed on the W810 next to the MDF name, and the listing is sorted by zone number. Each of the 20 LD on an LME bay is terminated through a 32-pair cable on to the MDF.

Fig. 16 illustrates typical zoning patterns for the terminating connections between the 32 line circuits in each LD and the MDF. The subject of MDF terminations is described in detail in 297-1001-152.

Plug-in provisioning (PIP)

The PIP option enables the Telco to plan for future expansion at the time of installation of the office, by leaving vacant card positions in the PM initially, and purchasing circuit cards as required. 4.09 For PIP to be utilized successfully, the rules for line card, trunk card and trunk group assignments must be followed. Circuit cards cannot be plugged arbitrarily into any PM card location. A uniform spread of lines, trunks and trunk groups, and vacant card positions, across the PM and NM is essential.

Traffic characteristics

Architecture of DMS-100 Family

The architecture of the DMS-100 Family systems is such that, as long as the assignment rules are adhered to, and as long as network traffic does not exceed the rated capacity, no traffic balancing is required.

Each office is engineered so that the total traffic from the PM does not exceed the total capacity of the network modules. For example, 8 NM (per plane) have a total capacity of 8X52,300 ABSBH CCS. Table A shows the CCS engineered limits per network module for various sized offices. For 1-8 NM, the ABSBH CCS engineered limit for each NSG is 6537 (i.e., 52,300/8). The DMS office attains optimum performance when the load to ech NSG in each network module is equal. However, engineering at the NM and NSG level is not necessary when the assignment rule of spreading peripherals uniformly is followed. Each NSG is then a scaled-down model of the total network and the traffic condition for each NSG is automatically satisfied.

To cover random deviations from the assigned load, due to errors in estimation of the load at the time of installation or due to unexpected changes in the traffic at any given time, there is an inherent allowance above the engineered limits for both the NM and the NSG. A given NSG can handle up to 20% above the engineered limit. For example, if the limit is 6537 CCS, the 20% buffer will allow up to 7844 CCS. Similarly, a given NM has a 7% junctor buffer. It is important to note that the total traffic capacity must remain at the engineered limit and is not allowed to increase by the 7 or 20%. Therefore, when the buffer is utilized by a given NM or NSG, a slight imbalance must occur to ensure no change in the total.

Two-Trial feature

If a call between an incoming trunk and the chosen outgoing trunk cannot be completed, the system will select a second idle trunk in the given outgoing group and try to complete the call. The second trunk must be located on a different NM (or a different NSG if there is only one NM). It is because of this reason and to avoid local congestion that the assignment system requires that the trunks from one trunk gorup be spread on as many NSG as possible.

Dual-Access feature

To reduce blocking within the network for terminating calls, each LM must be connected to at least two separate NM or NSG, as described in the assignment rules.

Deloading

As a result of the high traffic capacity of the DMS network (27 CCS/channel up to 8 NM's, 24 in the worst case of 32 NM's), the network will be appearance-limited for most practical situations. Should the extremely unlikely case of a traffic-limited network arise - where CCS/channel exceeds 27 (for up to 8 NM's) or 24 (for 32 NM's) - the problem can be solved without traffic balancing by deloading the network. In a deloaded network, only some of the 8 ports of a NSG will be equipped, as follows:

Equipped Ports	CCS/Channel NM 1-8	9-16	17-20	21-22
7	31	30	30	28
6	36	35	35	33
5	NA	36	36	36

NA = Not Applicable

	Local		Toll or Local & Toll	
	ABSBH	HDBH	10HDBH	HDBH
1-8 NM/plane	52,300	65,100	53,900	56,100
9-16 NM/plane	51,600	54,500	51,400	54,500
17-20 NM/plane	50,600	53,400	49,000	53,400
21-32 NM/plane	46,000	51,900	42,400	49,900

These values are calculated based on an analytical model which assumes:

1 Grade of service objectives as given in DMS product specification.

2 Two attempts for a call. (trunks)

3 Dual access. (lines)

4 7% Junctor buffer for a given NM.

5 20% buffer for a given NSG.

Note: PLN-8991-104 (Provisioning Guide) should be referenced for complete information on capacities.

DMS-100 Family

Peripheral and Trunk group/Line Assignments

Reference guide

Product Documentation—Dept 3423
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P.O. Box 13010
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1-877-662-5669, Option 4 + 1

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant.This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules, and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user’s own expense Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of FCC Rules, Docket No. 89-114, 55FR46066 The SL-100 system is certified by the Canadian Standards Association (CSA) with the Nationally Recognized Testing Laboratory (NRTL). This equipment is capable of providing users with access to interstate providers of operator services through the use of equal access codes. Modifications by aggregators to alter these capabilities is a violation of the Telephone Operator Consumer Service Improvement Act of 1990 and Part 68 of the FCC Rules

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